Structure Silicon Monolithic Integrated Circuit

Product Name Power supply for CCD camera / White LED driver / RGB LED driver for mobile phone

Type **BD6025GU**

Features A system power supply for the CCD camera module
Built-in white LED driver and RGB LED driver

○Absolute Maximum Ratings (Ta=25 °C)

Parameter	Symbol	Rating	Unit	Condition
Maximum Applied Voltage 1	VMAX1	20(*1)	V	
Maximum Applied Voltage 2	VMAX2	16(*2)	V	
Maximum Applied Voltage 3	VMAX3	15(*3)	V	
Maximum Applied Voltage 4	VMAX4	-13.5(*4)	V	
Maximum Applied Voltage 5	VMAX5	6(*5)	V	
Power Dissipation	Pd	2413(*6)	mW	
Operating Temperature Range	Topr	-30 to 85	°C	
Storage Temperature Range	Tstg	-55 to 150	°C	

(*1) VPLUS11, VPLUS12, SBD, SBDSENS, VPLUS2 pin (*2) CAMP, CAMPS pin
(*3) LEDR, LEDG, LEDB, BKLED, FLED1 pin (*4) VNEG, CAMN, CAMNS pin (*5) Except Note1~Note4 pin
(*6) Power dissipation deleting is 19.3mW/ °C, when it's used in over 25 °C.
(It's deleting is on the board that is ROHM's standard))

○Recommended operating conditions (VBAT≥VIO, Ta=-30 to 85 °C)

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
VBAT input voltage	VBAT	2.7	3.6	4.5	V	
VIO input voltage	VIO	1.62	-	3.3	V	

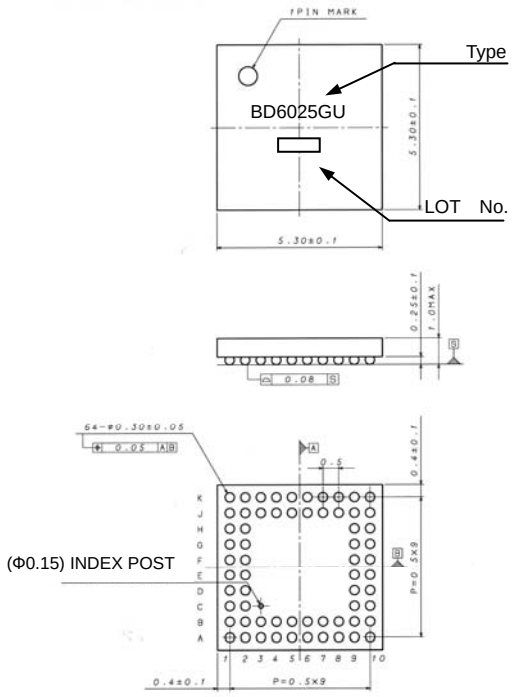
This product isn't designed to protect itself against radioactive rays.

○Electrical Characteristics

Unless otherwise specified, Ta=25°C, VBAT=3.6V, VIO=1.8V/3.0V, VCC=2.45V

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Circuit Current						
VBAT Circuit current 1	IQ1	-	0.5	3.0	μA	RSTB=0V
VBAT Circuit current 2	IQ2	-	0.1	3.0	μA	RSTB=0V, VIO=0V
VBAT Circuit current 3	IQ3	-	6.2	9.3	μA	REGVCC ON (Energy save mode)
VBAT Circuit current 5	IQ5	-	11	16	μA	REGVCC ON (Energy save mode) REG1 ON (Energy save mode) REG2 ON (Energy save mode)
VBAT Circuit current 8	IQ8	-	17	26	mA	REGVCC ON (Nomal Mode) SWREG1 ON (Vo=14V, Io=1mA) (Add 30h=01h, Add 80h=01h) REGCP ON, REGCN ON
SWREG1 (DC/DC for White LED and Power supply for Camera)						
FLED1 drive current 3	I_{FLED13}	27.0	30.0	33.0	mA	Add=80h Data=1Eh
BKLED drive current 3	I_{BKLED3}	27.0	30.0	33.0	mA	Add=90h Data=1Eh
SWREG2 (DC/DC for RGB LED)						
LEDR Drive current (Large current)	I_{LEDR22}	135	150	165	mA	Add=A0h Data=0Ch Add=50h Data=1Eh
LEDG Drive current (Large current)	I_{LEDG22}	135	150	165	mA	Add=A0h Data=0Ah Add=60h Data=1Eh
LEDB Drive current (Large current)	I_{LEDB22}	135	150	165	mA	Add=A0h Data=09h Add=70h Data=1Eh
REGCP (15V/13V/12V LDO)						
Output voltage 1	VO151	14.5	15.0	15.5	V	Io=60mA, VPLUS12=16V REGCPVSEL1=0, REGCPVSEL2=0
Output voltage 2	VO152	12.5	13.0	13.5	V	Io=60mA, VPLUS12=15V REGCPVSEL1=1, REGCPVSEL2=0
Output voltage 3	VO153	11.5	12.0	12.5	V	Io=60mA, VPLUS12=15V REGCPVSEL1=1, REGCPVSEL2=1
REGCN (-8V/-7.5/-7V LDO)						
Output voltage 1	VO81	-8.5	-8.0	-7.5	V	Io=50mA, VNEG=-10V REGCNVSEL1=0, REGCNVSEL2=0
Output voltage 2	VO82	-8.0	-7.5	-7.0	V	Io=50mA, VNEG=-10V REGCNVSEL1=1/0, REGCNVSEL2=1
Output voltage 3	VO83	-7.5	-7.0	-6.5	V	Io=50mA, VNEG=-9V REGCNVSEL1=1, REGCNVSEL2=0
REG1 (3.0V/3.1V LDO)						
Output voltage 2	VO12	3.04	3.1	3.16	V	Io=150mA, REG1VSEL=1,REG1MD=1
REG2 (1.2V/1.8V LDO)						
Output voltage 3	VO22	1.74	1.8	1.86	V	Io=100mA, REG2VSEL=H,REG2MD=1

○External dimensions

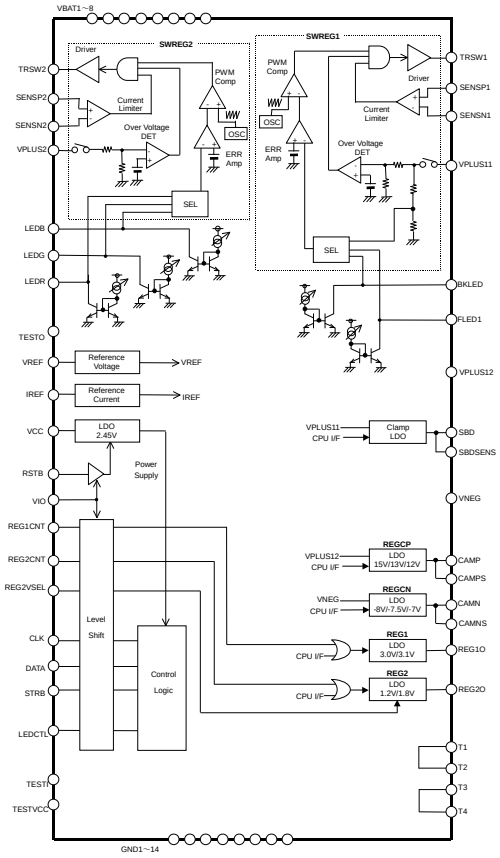


VCSP85H5 (64PIN) (Unit : mm)

○Terminals

PIN	PIN Name	PIN	PIN Name	PIN	PIN Name
A1	T1	C9	CAMPS	J1	VIO
A2	GND2	C10	CAMP	J2	TESTI
A3	VBAT1	D1	REG2CNT	J3	REG2VSEL
A4	LEDR	D2	SENSN2	J4	VCC
A5	GND3	D9	TESTO	J5	GND12
A6	LEDB	D10	REG2O	J6	FLED1
A7	CAMN	E1	VBAT8	J7	TRSW1
A8	VNEG	E2	TESTVCC	J8	SENSP1
A9	GND6	E9	VBAT4	J9	GND9
A10	T2	E10	VBAT3	J10	SBD
B1	VPLUS2	F1	LEDCTL	K1	T4
B2	GND1	F2	REG1CNT	K2	GND13
B3	VBAT2	F9	VREF	K3	VBAT7
B4	TRSW2	F10	REG1O	K4	BKLED
B5	LEDG	G1	RSTB	K5	GND11
B6	GND4	G2	CLK	K6	VBAT6
B7	CAMNS	G9	SBDSENS	K7	GND10
B8	GND5	G10	IREF	K8	VPLUS11
B9	GND7	H1	DATA	K9	SENSN1
B10	VPLUS12	H2	STRB	K10	T3
C1	SENSP2	H9	GND8	-	-
C2	GND14	H10	VBAT5	-	-

○Block diagram



○Cautions on use

(1) Absolute Maximum Ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

(2) Power supply and GND line

Design PCB pattern to provide low impedance for the wiring between the power supply and the GND lines. Pay attention to the interference by common impedance of layout pattern when there are plural power supplies and GND lines. Especially, when there are GND pattern for small signal and GND pattern for large current included the external circuits, please separate each GND pattern. Furthermore, for all power supply terminals to ICs, mount a capacitor between the power supply and the GND terminal. At the same time, in order to use a capacitor, thoroughly check to be sure the characteristics of the capacitor to be used present no problem including the occurrence of capacity dropout at a low temperature, thus determining the constant.

(3) GND voltage

Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state. Furthermore, check to be sure no terminals are at a potential lower than the GND voltage including an actual electric transient.

(4) Short circuit between terminals and erroneous mounting

In order to mount ICs on a set PCB, pay thorough attention to the direction and offset of the ICs. Erroneous mounting can break down the ICs. Furthermore, if a short circuit occurs due to foreign matters entering between terminals or between the terminal and the power supply or the GND terminal, the ICs can break down.

(5) Operation in strong electromagnetic field

Be noted that using ICs in the strong electromagnetic field can malfunction them.

(6) Input terminals

In terms of the construction of IC, parasitic elements are inevitably formed in relation to potential. The operation of the parasitic element can cause interference with circuit operation, thus resulting in a malfunction and then breakdown of the input terminal. Therefore, pay thorough attention not to handle the input terminals, such as to apply to the input terminals a voltage lower than the GND respectively, so that any parasitic element will operate. Furthermore, do not apply a voltage to the input terminals when no power supply voltage is applied to the IC. In addition, even if the power supply voltage is applied, apply to the input terminals a voltage lower than the power supply voltage or within the guaranteed value of electrical characteristics.

(7) External capacitor

In order to use a ceramic capacitor as the external capacitor, determine the constant with consideration given to a degradation in the nominal capacitance due to DC bias and changes in the capacitance due to temperature, etc.

(8) Thermal shutdown circuit (TSD)

This LSI builds in a thermal shutdown (TSD)circuit. A thermal shutdown circuit works when the junction temperature is beyond detection temperature. Then, a part of the LSI or all is made a state of off. The thermal shutdown circuit, which is aimed at isolating the LSI from thermal runaway as much as possible, is not aimed at the protection or guarantee of the LSI. Therefore, do not continuously use the LSI with this circuit operating or use the LSI assuming its operation.

(9) Thermal design

Perform thermal design in which there are adequate margins by taking into account the permissible dissipation (Pd) in actual states of use.

(10) LDO

Use each output of LDO by the independence. Don’t use under the condition that each output is short-circuited because it has the possibility that a operation becomes unstable.

(11) DC/DC converter

Please select the low DCR inductors to decrease power loss for DC/DC converter. Please choose the external parts not to exceed "Maximum Ratings" of the coil, the switching transistor, the diode and the resistance for the electric current detection".

(12) Other cautions on use

Please consult supplementary documents such as technical notebook, function manual and application notebook of this LSI.

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